

# EVALUATION OF A MICROPROCESSOR-CONTROLLED PROSTHETIC KNEE-ANKLE SYSTEM

## OBJECTIVE

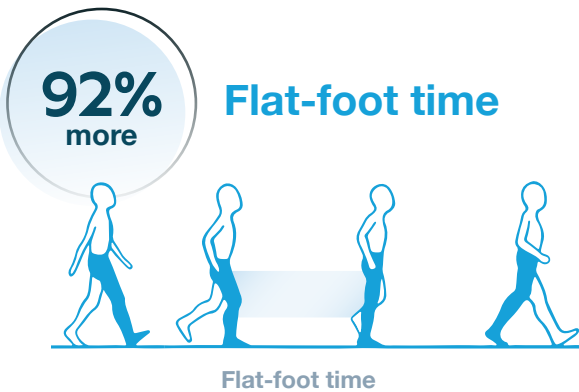
To demonstrate the improved service provided by SYNSYS microprocessor full-leg system compared with a microprocessor-controlled prosthetic knee.

## METHOD

A prospective, multicenter, randomized, and crossover study. The results were based on 12 subjects, and the study took place over 4+ years.

Both groups (Group 1 and Group 2) had 5 visits over 12 weeks, starting the trial (Visit 0) with inclusion and setting of the device. At Visit 1 and Visit 3, control and validation was performed with a Certified Prosthetist/Orthotist (CPO). Functional tests, questionnaires, and Quantified Motion Analysis (QMA) were performed at Visit 2 and Visit 4. At 6 weeks, Group 1 switched from their usual prostheses to the use of SYNSYS, while Group 2 switched from SYNSYS to the use of their usual prosthesis.

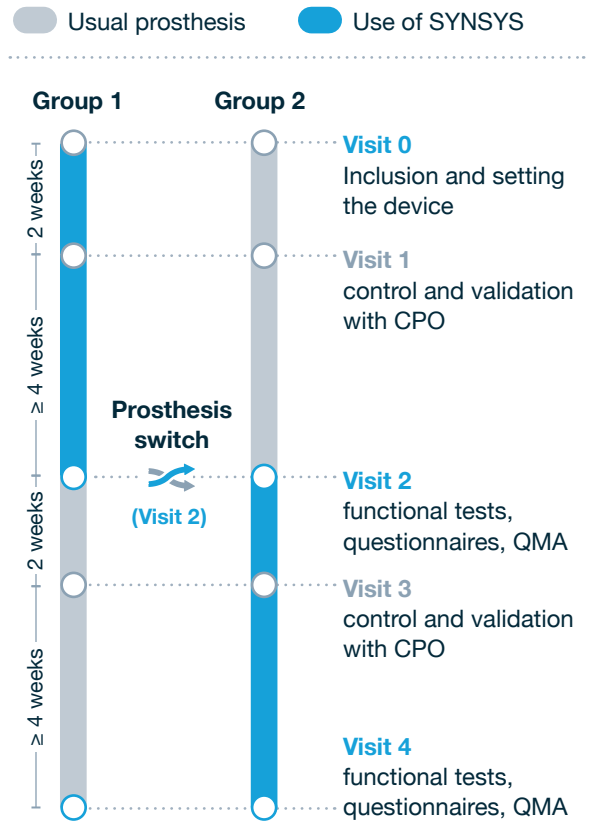
## RESULTS



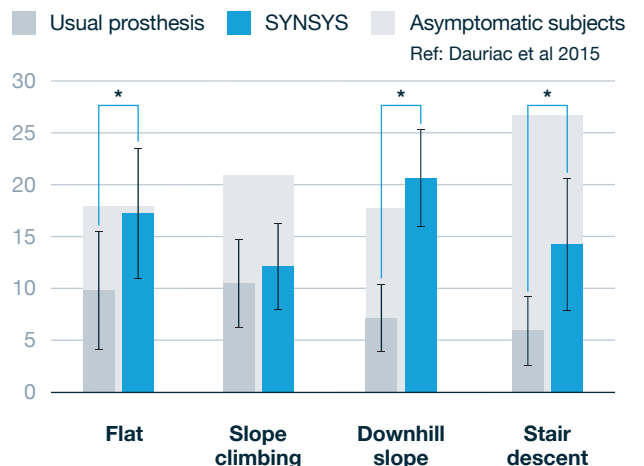
SYNSYS out-performs the usual prosthesis in flat, slope climbing, downhill slope, and stair descent.

\*p<0.05 = significant difference

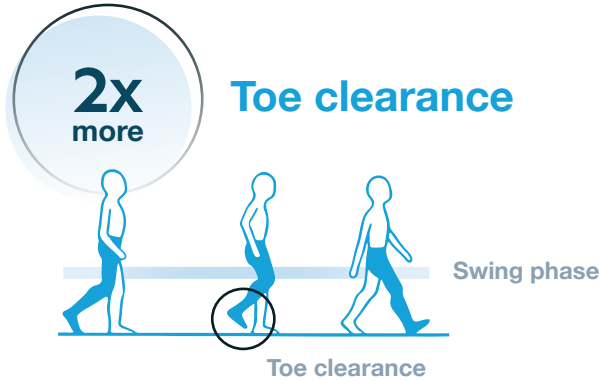
## Recruitment Timeline



## Flat-foot time (% walking cycle)



## RESULTS (CONT.)

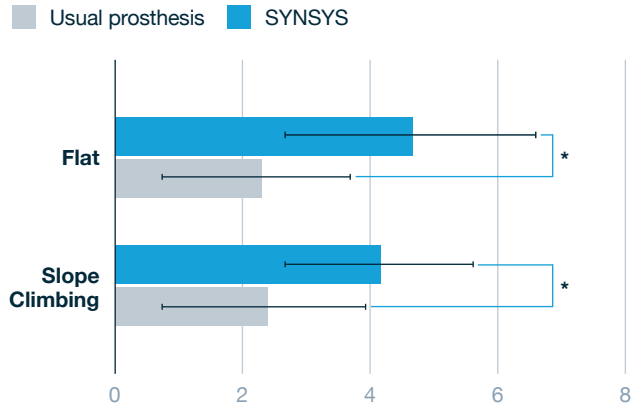


Increased toe clearance due to active dorsiflexion of the toes during swing phase, proven to increase stability and confidence.



Using the SF-36 Quality of Life Questionnaire, we tested Physical (PCS) and Mental (MCS) and found that SYNOPSIS users reported both better social functioning and physical functioning. Additionally, on a 12-subscale Prosthesis Evaluation Questionnaire (PEQ), 8 out of 12 improved with SYNOPSIS and there was a significant improvement in appearance score.

### Minimum toe clearance (in centimeters)



\*p<0.05 = significant difference

Questionnaire	Result
SF-36 Physical (PCS)	Better social functioning*
SF-36 Mental (MCS)	Better physical functioning*
Prosthesis Evaluation Questionnaire (PEQ)	Better appearance*
6-minute walk test	Lower perceived effort

\*p<0.05 = significant difference

## CONCLUSION

**SYNOPSIS** statistically significantly **improves daily life**, provides users with **functional benefits** close to a natural gait, and **enhances stability** and **security**.

### Reference:

Requena, C et al. (2023, September 18). Increased of stability and security in transfemoral amputees with a knee-ankle synergistic system. Presented at ESMAC. Athens, Greece.

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